Electronic Supplementary Material

Here we provide meridional plots of the components of the three Dudley-James type flows ($t_1^0 s_1^0$, $t_1^0 s_2^0$ and $t_2^0 s_2^0$), in order to give more detail about the structure of these optimal flows.

$t_1^0 s_1^0$ optimum

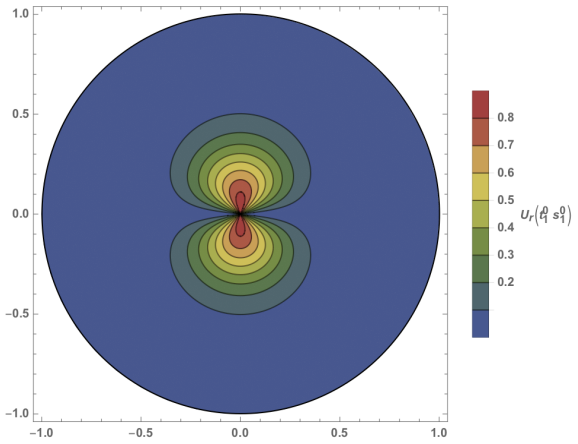

Figure 1: Meridional plot of the radial component of the $t_1^0 s_1^0$ optimal flow.

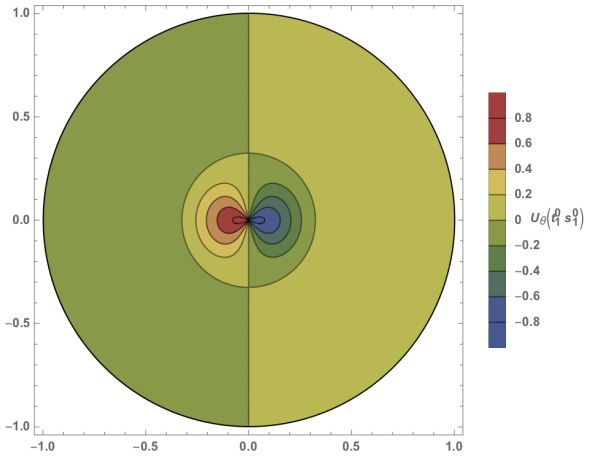

Figure 2: Meridional plot of the theta component of the $t_1^0 s_1^0$ optimal flow.

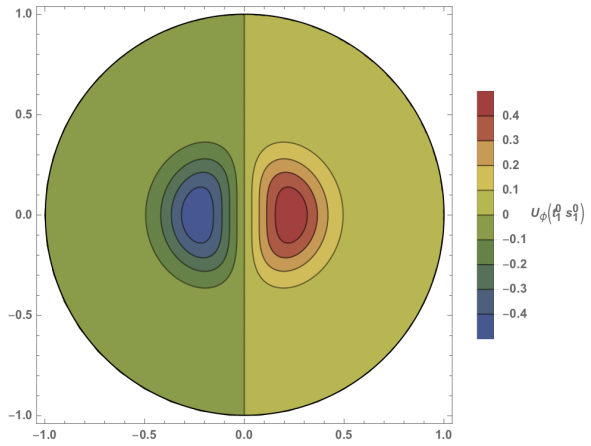

Figure 3: Meridional plot of the phi component of the $t_1^0 s_1^0$ optimal flow.

$t_1^0 s_2^0$ optimum

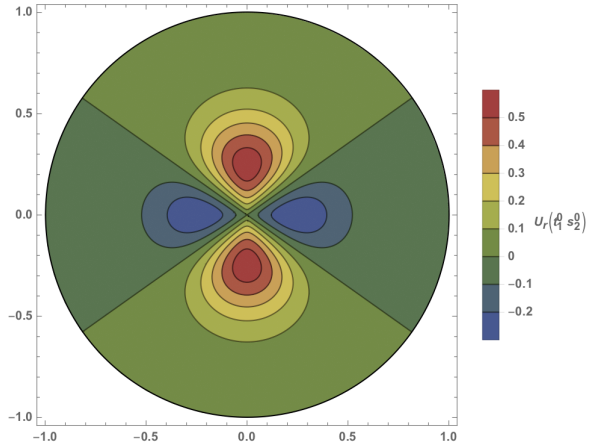

Figure 4: Meridional plot of the radial component of the $t_1^0 s_2^0$ optimal flow.

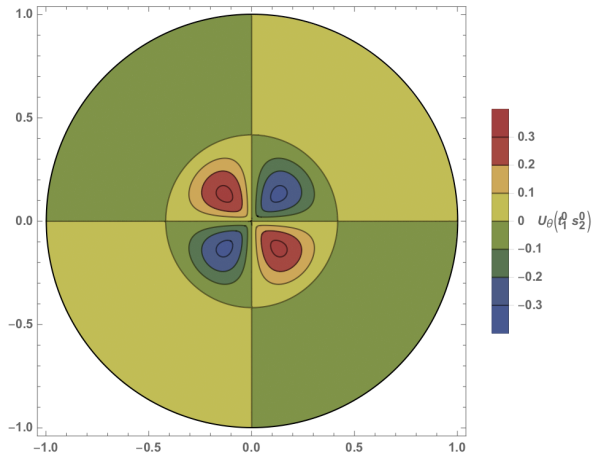

Figure 5: Meridional plot of the theta component of the $t_1^0 s_2^0$ optimal flow.

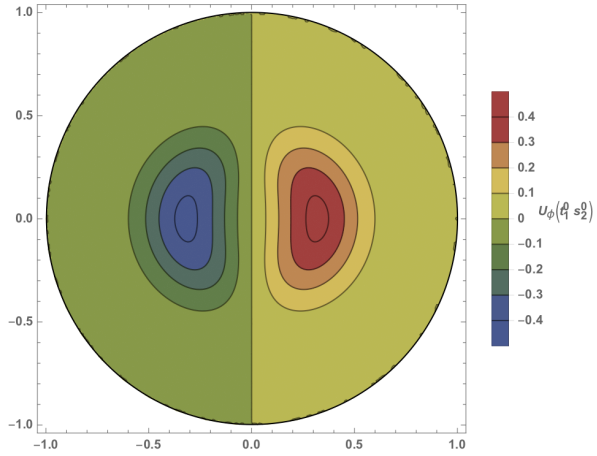

Figure 6: Meridional plot of the phi component of the $t_1^0 s_2^0$ optimal flow.

$t_2^0 s_2^0$ optimum

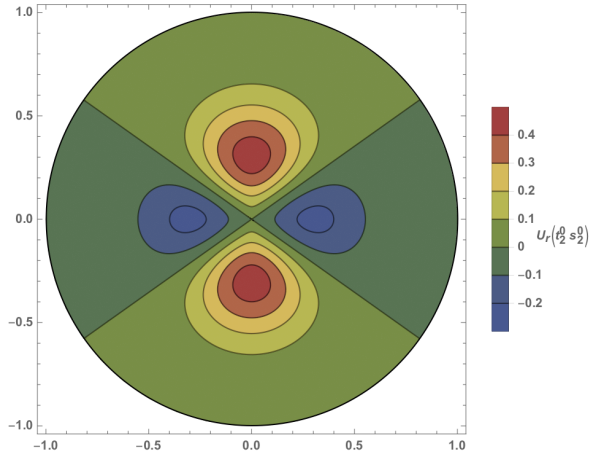

Figure 7: Meridional plot of the radial component of the $t_2^0 s_2^0$ optimal flow.

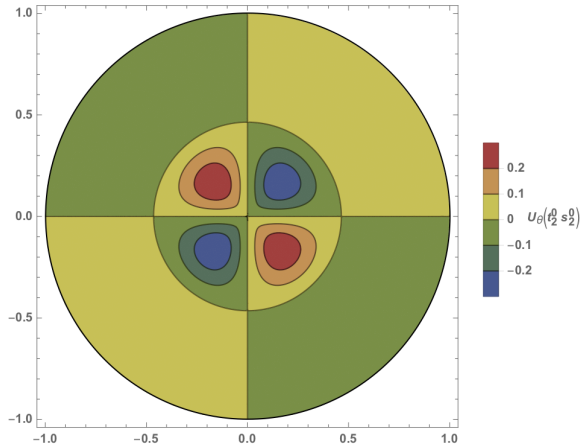

Figure 8: Meridional plot of the theta component of the $t_2^0 s_2^0$ optimal flow.

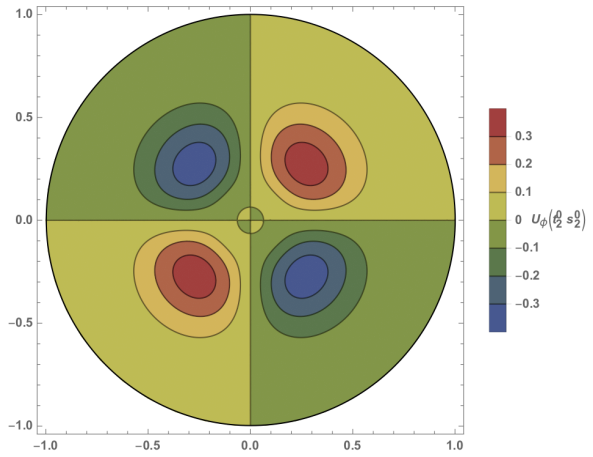

Figure 9: Meridional plot of the phi component of the $t_2^0 s_2^0$ optimal flow.